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**PATENT**
**Attorney Docket No.: SP01-095**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| Inventor: | Bradford Giles Ackerman, et al. | |
| Serial No: | 09/844947 | Examiner: Peter Chin |
| Filing Date: | April 27, 2001 | Group Art Unit: 1731 |
| Title: | METHOD FOR PRODUCING TITANIA-DOPED FUSED SILICA GLASS | |

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

**BRIEF ON APPEAL**

This Brief supports the appeal to the Board of Patent Appeals and Interferences from the final rejection dated March 29, 2005, in the application listed above. Applicant filed the Notice of Appeal on April 11, 2005, and now submits this Appeal Brief in triplicate. Applicant also has filed the appropriate petition and paid the required fee to gain an extension of the due date for filing this Brief to the Board.

## I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Corning Incorporated.

## II. RELATED APPEALS AND INTERFERENCES

With respect to the appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal, there are no such appeals or interferences.

## III. STATUS OF CLAIMS

Claims 1, 2, 4-9, 13, 15, 20, 21, 23 and 24 were rejected in the Final Office Action dated January 25, 2005. These are the pending claims that are the subject of this Appeal and are set forth in the attached Appendix. Applicant had amended claim 1 after Final Rejection in an Amendment dated March 11, 2005 that was filed by facsimile transmission. ***However,*** *for purposes of this Appeal the Amendment filed March 11, 2005 should be considered as not having been made due to the Examiner's rejection of the Amendment and statement that further prosecution would require an additional search. The claims presented herein are those that existed at the time the Final Office Action was issued.*

## IV. STATUS OF AMENDMENTS

The Amendment after Final Rejection filed on March 11, 2005 *has not been entered.* By an Advisory Action dated March 29, 2005 that Examiner stated that the amendments are rejected on the grounds that (a) they raise new issues that would require further consideration and/or search, and (b) they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal. The Examiner's Note states that the amendment to claim 1 is rejected because the subject matter is being claimed for the first time. *This, for purposes of this Appeal the Amendment filed March 11, 2005 should be*

*considered as not having been made due to the Examiner's rejection of the Amendment and statement that further prosecution would require an additional search. The claims presented herein are those that existed at the time the Final Office Action was issued*

## V. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention relates to a method for producing a fused silica glass containing titania (a $SiO_2$-$TiO_2$ glass).

Claim 1, the only independent claim, relates to a method for making a fused cilica glass. In the process particles of silica and titania ar synthesized bydelivering their respective percursors to a burner. Subsequently, a column of a solid porous preform is grown by successively depositing the particles on a deposition surface at a temperature below a minimum temperature at which the particles can consolidate either partially or fully into dense glass while successively translating the deposition surface away from the burner. Finally, in a separate step the porous preform is consolidated into a dense glass.

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The claims are currently rejected by the Patent office as follows:

> Claims 1, 2, 4-9, 13, 15, 20, 21, 23 and 24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Blackwell et al. (U.S. Patent No. 5,152,819) in view of Nakahara et al. (U. S. Patent No. 4,419,116), Koide et al. (U.S. Patent No.) or Terashima et al. (U. S. Patent No. 5,423,898) and Roba et al. (U.S. Patent No. 6,672,110).

## VII. GROUPING OF CLAIMS

In compliance with 37 C.F.R. § 1.192(c)(5), Applicant states that all of the claims do stand or fall together. Claim 1 is the independent claim and claims 2, 4-9, 13, 15, 20, 21, 23 and 24 depend on claim 1 either directly or indirectly through another dependent claim.

## VIII. ARGUMENTS

The rejection of Claims 1, 2, 4-9, 13, 15, 20, 21, 23 and 24 as being unpatentable under 35 U.S.C. §103(a) as being unpatentable over Blackwell et al. (U.S. Patent No. 5,152,819) in view of Nakahara et al. (U. S. Patent No. 4,419,116), Koide et al. (U.S. Patent No.) or Terashima et al. (U. S. Patent No. 5,423,898) and Roba et al. (U.S. Patent No. 6,672,110) is improper.

In the final Office Action of January 25, 22005, the Examiner rejected pending claims 1, 2, 4-9, 13, 15, 20, 21, 23 and 24under 35 U.S.C. § 103(a) as being unpatentable over Blackwell et al. (U.S. Patent No. 5,152,819) in view of Nakahara et al. (U. S. Patent No. 4,419,116), Koide et al. (U.S. Patent No. 5,425,795) or Terashima et al. (U. S. Patent No. 5,423,898) and Roba et al (U.S. Patent No.6,67210). On page 2 of the Final Office Action, the Examiner stated that:

> "Blackwell et al discloses a process for making an optical fiber glass preform. Silica precursor is mixed with a metal oxide dopant precursor, Ti oxide precursor and reacted in a soot burner to form soot. The soot is deposited on a rotating mandrel and subsequently consolidated in a He and Cl atmosphere. Blackwell is silent as to the minimum temperature of the soot deposition and the translation motion of the mandrel. Inherently the temperature during soot deposition is below the temperature at which the soot particles consolidate otherwise there would be solid fused glass instead of a soot preform. In any case, Roba et al teaches it is advantageous that the temperature of the soot preform during soot deposition be a temperature between 700 and 1200 °C. Note that Roba et al includes Ti doped soot preform, penultimate paragraph, column 5. It is also noted that "successively translating the deposition surface away from the burner", is an obvious conventional feature of devices used to form the soot preform and of which Koide et al, Nakahara et al or Terashima et al are cited as evidence."

Applicant respectfully submits that the Examiner failed to provide a *prima facie* case of obviousness because one of ordinary skill in the art would not be motivated to use or modify the teaching of Blackwell et al. in view of Roba et al. and the other cited art to obtain Applicant's invention. In re Vaeck, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991).

"The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fritch, 23 U.S.P.Q.2d 1780, 1783-84 (Fed. Cir. 1992). The Examiner did not, and is unable, to point to any place in Blackwell et al., Roba et al., and other cited references where it suggests or provides a motive to modify the method described by Blackwell et al. to obtain the method described by Applicants. In particular, there is no specific teaching in any reference with regard depositing the soot on a "bait" or mandrel at a temperature below the consolidation temperature of the soot.

**First**, Blackwell et al. teach generating vapors and passing vapors through a burner flame to form a stream of volatile gases and finely-divided spherical particles of soot. Blackwell et al. teach collecting the soot on a mandrel or bait tube to form a porous preform. Blackwell et al. teach that the final product of soot collection, the porous preform, is then subjected to high temperature in which the preform consolidates into a nonporous monolithic glass body.

The Examiner admits that Blackwell et al. is silent as to the minimum temperature of the soot deposition. The Examiner has asserted that "inherently the temperature of soot deposition [in Blackwell et al.] is below the temperature at which the soot particles consolidate otherwise there would be solid fused glass instead of a soot preform." However, the terms "soot preform" and/or "porous preform" is not sufficient to establish the temperature at which the particles of soot were deposited. For example, particles of soot that

are only partially consolidated could be described as soot or porous preform. In fact, Applicants submit that Blackwell et al. indicate that in the process they describe, which uses CVD (chemical vapor deposition) to form the soot preform, there is partial consolidation of the preform during the deposition process. Blackwell et al., column 9, line 67, to column 10, line 3, reads:

> "The resulting soot is deposited on a rotating rod 9, thus forming a preform or blank 10 of silica soot. The preform is then heat treated in a consolidation furnace 11, in a He/Cl atmosphere to full consolidation."

The statement that the preform is heated to "full consolidation" clearly indicates that there is partial cnsolidation during the deposition process.

In contrast to Blackwell et al., Applicants state in claim 1, lines 5-7, that the particles (soot) formed are deposited on ". . . a deposition surface at a temperature below a minimum temperature at which the particles can consolidate either partially or fully into dense glass . . ." Thus, Applicants specifically teach that the preform is formed at a temperature at which there is no consolidation (partial or full) of the deposited particles [soot] into a glass.

**Second**, The Examiner combines Blackwell et al. with Roba et al., citing Roba et al. as teaching that it is advantageous that the temperature of the soot preform during soot deposition be a temperature between 700 and 1200 °C. Applicants submit that this combination does not render their invention unpatentable for being obvious over the combination of Blackwell et al. and Roba et al.

The method described by Roba et al. is completely different from the process of the present invention. In particular, the method of Roba et al. is a flame-free method that requires water as a reactant. Referring to Roba et al., Summary of the Invention:

(a) in column 2, lines 40-42, the method is described as being ". . . a hydrolysis reaction for producing an optical perform. . ."; and

(b) in column 2, lines 46-46-48, the hydrolysis reaction is described as being ". . . a flame-free hydrolysis, i.e., a reaction in which the process temperature can be precisely controlled, as opposed to convention flam-hydrolysis . . ."; and

(c) in column 2, lines 60-61, the method is stated as comprising one requiring a ". . . first gaseous or vapor phase composition disposed to provide a hydrolyzable glass precursor . . .", and in column 2, lines 63-64, "supplying water as a second gaseous or vapor phase composition . . ."

Applicants submit that this method is completely different from the methods described by Applicants in their specification. Applicants further submit that the 700-1200 °C temperature range described by Roba et al. and cited by the Examiner is peculiar to the method they claim and is the result of a temperature gradient that they provide within the reaction chamber as described in column 3, lines 5-8, ". . .characterized in that a temperature gradient is provided inside of said [reaction] chamber, said temperature gradient being such that the temperature increases from said inlet zone to said outlet of the reaction chamber." Referring to Roba et al. Figure 3, the gradient is believed provided by the element represented by numeral **30** (*which numeral is not mentioned in the specification*), which seems similar to the electrical resistance heater 37 described in column 7, lines 9-13.

**Third**, the Examiner cites Nakahara et al. (U. S. Patent No. 4,419,116), Koide et al. (U.S. Patent No. 5,425,795) or Terashima et al. (U. S. Patent No. 5,423,898) for teaching the "successive translating the deposition surface away from the burner." Applicants have reviewed these patents and comment that while Terashima et al. do not teach either the formation of any preform nor rotation. Terashima et al. Nakahara et al. (U. S. Patent No. 4,419,116) and Koide et al. (U.S. Patent No. 5,425,795) do teach rotation of the bait rod during formation of the preform, the disclosure therein does not render Applicants' method

obvious when combined with Blackwell et al. and Roba et al. The fact that Tereshima et al., Nakahara et al. and Kiode et al. teach an element of the Applicants' invention is not sufficient to make it obvious when other elements of Applicants' invention such as depositing the soot below consolidation (partial or full) temperature is not disclosed in the other art with which Tereshima et al., Nakahara et al. and Kiode et al. are combined.

The U.S. Court of Appeals for the Federal Circuit has stated that the Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness and in the case of combined references, the Examiner can satisfy this burden "only by showing some objective teaching in the prior art . . . would lead that individual to combine the relevant teachings of the references." In re Fine, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Moreover, both the suggestion and the reasonable expectation of success must be found in the prior art, not in the applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991).

Cited references should not be considered in a vacuum, but against the background of the references as a whole. "The question in a §103 case is what the references would collectively suggest to one of ordinary skill in the art." In re Ehrreich, 200 U.S.P.Q. 504, 509-10 (C.C.P.A. 1979). If the collective references indicate that those skilled in the art would ignore statements as speculative, then those statements cannot be considered teachings for purposes of an obviousness rejection. Id.; In re Oelrich, 198 U.S.P.Q. 210, 214 (C.C.P.A. 1978). In the instant case, as discussed above, the primary reference of Blackwell et al. does not teach or suggest a critical feature of the claimed invention; namely, deposition of soot below consolidation temperature. This feature is not supplied by the secondary reference of Roba et al or the additional references of Nakahara et al., Koide et al. or Terashima et al.

Consequently, Applicants submit that not only did the Examiner fail to meet his burden of establishing a *prima facie* case because one of ordinary skill in the art would lack the motivation to modify Blackwell et al.; but he failed to meet that burden because one skilled in the art would not find Applicants' method when Blackwell et al. is combined with Roba et al., Nakahara et al., Koide et al. and Terashima et al. Accordingly, one skilled in the art would not reasonably expect to successfully arrive at Applicant's claimed invention by combining the primary and secondary references.

## IX. CONCLUSION

In conclusion, Applicant requests a reversal of each of the grounds of rejection maintained by the Examiner.

Please charge the necessary fees of $500 for filing the Brief on Appeal to our Deposit Account No. 03-3325. If there are any other fees due in connection with the filing of this Brief on Appeal, please charge the fees to our Deposit Account No. 03-3325. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

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Walter M. Douglas 3 June 2005

Walter M. Douglas

## APPENDIX TO BRIEF ON APPEAL

The claims on appeal are as follows. Claim 1 is shown with the amendment submitted in response to the Final Office Action.

**Listing of Claims:**

1. (rejected) A method for producing a fused silica glass containing titania, comprising:

synthesizing particles of silica and titania by delivering a mixture of silica precursor and a titania precursor to a burner;

growing a column of solid porous preform by successively depositing the particles on a deposition surface at a temperature below a minimum temperature at which the particles can consolidate either partially or fully into dense glass while successively translating the deposition surface away from the burner; and

subsequently consolidating the porous preform into dense glass.

2. (rejected) The method of claim 1, wherein a translation speed of the deposition surface is adjusted to maintain a substantially constant distance between an end portion of the porous preform remote from the deposition surface and the burner during deposition.

3. (previously cancelled)

4. (rejected) The method of claim 1, wherein consolidating the porous preform into dense glass comprises heating the porous preform to a temperature in a range from 1200 to 1900°C.

5. (rejected) The method of claim 1, further comprising dehydrating the porous preform by exposing the porous preform to a heated, halide-containing atmosphere prior to consolidation.

6. (rejected) The method of claim 5, where in the heated, halide-containing atmosphere comprises chlorine.

7. (rejected) The method of claim 5, where in the heated, halide-containing atmosphere comprises fluorine.

8. (rejected) The method of claim 5, wherein the temperature of the heated, halide-containing atmosphere is in a range from 900 to 1100°C.

9. (rejected) The method of claim 1, wherein the glass contains 2 to 12% by weight titania.

10. – 12 (previously cancelled)

13. (rejected) The method of claim 5, wherein a translation speed of the deposition surface is adjusted to maintain a substantially constant distance between an end portion of the porous preform remote from the deposition surface and the burner during deposition.

14. (perviously cancelled)

15. (rejected) The method of claim 5, wherein consolidating the porous preform into dense glass comprises heating the porous preform to a temperature in a range from 1200 to 1900°C.

16. – 19. (perviously cancelled)

20. (rejected) The method of claim 1, wherein the minimum temperature is approximately 1200°C.

21. (rejected) The method of claim 20, wherein the temperature at which the particles are deposited is approximately 200 to 500°C less than the minimum temperature.

22. (previously cancelled)

23. (rejected) The method of claim 1, wherein a variation on coefficient of thermal expansion of the dense glass is in a range from -5 ppb/°C to +5 ppb/°C.

24. (rejected) The method of claim 1, further comprising rotating the deposition surface relative to the burner while successively depositing the particles on the deposition surface.